Volunteer Lake Assessment Program Individual Lake Reports

CONTOOCOOK LAKE, JAFFREY, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	5,888	**Max. Depth (m):**	7.1	**Flushing Rate (yr^{1})**	6.8
Surface Area (Ac.):	380	**Mean Depth (m):**	2.2	**P Retention Coef:**	0.5
Shore Length (m):	11,700	**Volume (m^{3}):**	1,944,000	**Elevation (ft):**	1009

TROPHIC CLASSIFICATION

Year	Trophic class
1988	MESOTROPHIC
2006	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

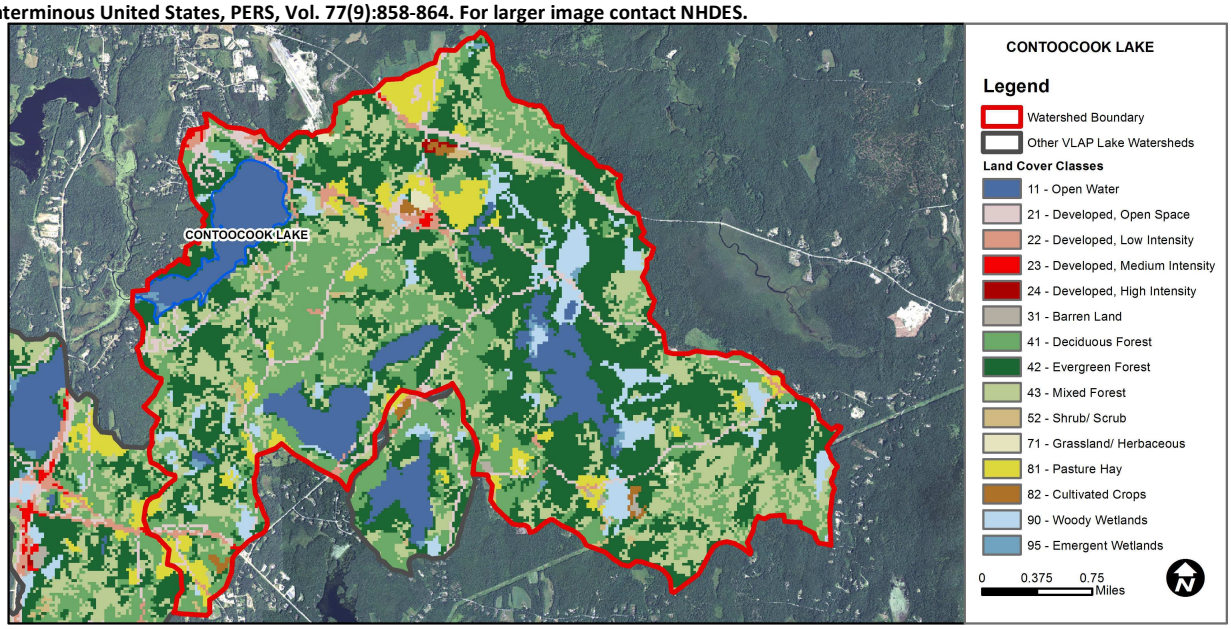
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

CONTOOCOOK LAKE - TOWN BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	9.12	Barren Land	0.18	Grassland/Herbaceous	0.34
Developed-Open Space	4.21	Deciduous Forest	21.28	Pasture Hay	4.42
Developed-Low Intensity	1.33	Evergreen Forest	32.86	Cultivated Crops	0.41
Developed-Medium Intensity	0.16	Mixed Forest	19.15	Woody Wetlands	5.37
Developed-High Intensity	0.08	Shrub-Scrub	0.65	Emergent Wetlands	0.48

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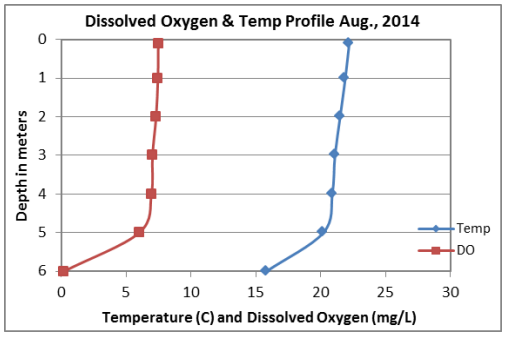
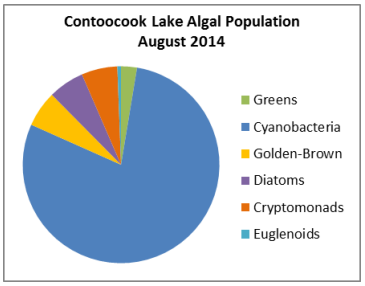
2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics*)

- **Chlorophyll-a:** Chlorophyll levels were slightly elevated in June and then decreased to average levels in July and August. Average chlorophyll levels were less than the state median and remained stable from 2013. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began. We hope to see this continue!
- **Conductivity/Chloride:** Epilimnetic (upper water layer) conductivity and chloride were slightly greater than the state medians, however not above a level of concern. Historical trend analysis indicates relatively stable epilimnetic conductivity with moderate variability between years. Below Airport, Squantum 3, Townline Inlet, and Walsh Inlet conductivity levels were slightly greater or less than the state median and not above a level of concern. Cochrane Inlet E and W, Outlet, Jowder Cove Inlet, Squantum Inlet, and Taft Inlet conductivity and chloride levels were elevated.
- **E. coli:** Squantum Inlet E. coli levels were elevated in July and greater than the state standard of 406 cts/100 mL for surface waters. This was likely due to wildlife influences in the wetland area. Below Airport, Squantum 3 and Townline Inlet E. coli levels were less than the state standard for surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus levels were average in June, increased in July, and remained stable into August. Average epilimnetic phosphorus decreased greatly from 2013 and historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic (lower water layer) phosphorus was average in June, decreased to low levels in July, and then increased in August. Jowder Cove Inlet and Walsh Inlet phosphorus levels were average and phosphorus levels have significantly decreased since 1994. Cochrane Inlet E, Outlet and Townline Inlet phosphorus levels were low. Cochrane Inlet W phosphorus levels were elevated in August. Squantum 3 and Inlet phosphorus levels were elevated on each sampling event likely due to wetland influences. Taft Inlet phosphorus levels were slightly elevated in June and August likely due to low flows.
- **Transparency:** Transparency was slightly lower in June likely due to the higher algal growth and then improved in July and remained stable into August. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **Turbidity:** Epilimnetic and hypolimnetic turbidities increased as the summer progressed, however algal growth was not the cause. In general tributary turbidities were higher in August due to low flow conditions.
- **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units in June and then decreased to less than desirable levels in July and August. Historical trend analysis indicates significantly decreasing (worsening) pH since monitoring began. Hypolimnetic pH was less than desirable. In general tributary pH levels were also less than desirable and potentially critical to aquatic life.
- **Recommended Actions:** The significantly decreasing phosphorus levels in Jowder Cove and Taft Inlets is a great sign and we hope to see this continue! In-lake turbidity levels may be influenced by milfoil removal and disturbance of bottom sediments. Schedule a deep spot sampling date before and after milfoil removal to assess any potential impacts. Encourage local road agents to obtain a NH Voluntary Salt Applicator License through UNH's Technology Transfer Center's Green SnowPro Certification program to help reduce chloride levels in tributaries. Keep up the great work!





NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Station Name	Table 1. 2014 Average Water Quality Data for CONTOOCOOK LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	3.17	4.07	16	53.3		13	2.95	2.73	1.70	6.50
Hypolimnion				77.4		11			3.20	6.20
Below Airport				52.5	40	94			3.11	6.26
Cochrane Inlet E			37	148.3		11			3.93	5.47
Cochrane Inlet W			32	131.2		17			0.91	5.28
Dam Outlet				93.0		9			0.73	5.85
Jowder Cove Inlet			26	106.7		14			0.89	6.21
Squantum 3			5	58.0	20	72			2.21	6.13
Squantum Inlet			41	173.6	220	67			1.31	6.33
Taft Inlet			76	296.3		19			1.07	6.17
Townline Inlet			13	59.5	47	11			1.33	6.33
Walsh Inlet			3	25.5		13			1.54	6.48

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Improving	Data significantly decreasing.
pH (epilimnion)	Worsening	Data significantly decreasing.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.